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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/903,760	07/13/2001	Yoshifumi Takata	50090-318	2858

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Washington, DC 20005-3096

EXAMINER

MITCHELL, JAMES M

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 04/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/903,760

Applicant(s)

TAKATA ET AL.

Examiner

James Mitchell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9-12 is/are rejected.
- 7) ☒ Claim(s) 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This office action is in response to the supplemental papers filed July 13, 2001.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broadbent (U.S 5,063,175) in view of Sato (U.S 5,907,787).

5. Broadbent discloses (Column 1, Lines 34-63; Fig 1, 2 A, B, C) a method of manufacturing a semiconductor device comprising the steps of forming a first interlayer insulating film (21) on a semiconductor substrate (20) forming a plurality of openings (22) in said interlayer film, forming conductor film (24) on said interlayer and removing a portion of the conductor film through an etch and forming conductive plugs (24, "metal

portions”) wherein the conductor film is formed of a polycrystalline (Column 5, Lines 40-43).

6. Broadbent does not appear to show the use of CMP after an etch process.

7. However Sato utilizes CMP after an etch step (shown in Fig 1; Column 3, Lines 1-15) comprising: removal of a conductor from insulating film through a chemical etch (“RIE”) to form a plug (“metal contact”) from said conductor filled in an opening and then leveling (Column 4, Lines 6-12) the surface of said insulating film from which the conductor film has been removed until the surface of the insulating film and plugs are flush by CMP.

8. It would have been obvious to one of ordinary skill in the art to incorporate a CMP step after an etch step to the interconnect structure of Broadbent, in order to eliminate inferior coverage as taught by Sato (Column 2, Lines 45-46, 59-64).

9. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Broadbent as applied to claim 9 and further in view of Koos et al. (U.S 5,934,980).

10. Broadbent does not appear to show a silicon oxide dielectric layer comprising phosphor (PSG), however Koos utilizes a PSG dielectric.

11. It would have been obvious to one of ordinary skill in the art to form the insulating layer of Broadbent with PSG, in order to provide a functionally equivalent dielectric layer as taught by Koos (Column 1, Lines 12-13).

12. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Broadbent.

13. Broadbent (Fig 3n) discloses a semiconductor device comprising a planarized insulating film (31) on a substrate (30) with a plurality of plugs therein.

14. In regards to the manufacturing method, it carries no patentable weight. Even though product -by- process claims are limited by and defined by the process, determination of patentability is based upon the product itself. The patentability of a product does not depend on its method of production. If the product in product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product is made by a different process." *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985).

15. A "product by process" claim is directed to the product per se, no matter how actually made, *In re Hirao and Sato et al.*, 190 USPQ 15 at 17 (CCPA 1976) (footnote 3). See also *In re Brown and Saffer*, 173 USPQ 685 (CCPA 1972); *In re Luck and Gainer*, 177 USPQ 523 (CCPA 1973); *In re Fessmann*, 180 USPQ 324 (CCPA 1974); and *In re Marosi et al.*, 218 USPQ 289 (CAFC 1983) final product per se which must be determined in a "product by, all of" claim, and not the patentability of the process, and that an old or obvious product, whether claimed in "product by process" claims or not. Note that Applicant has the burden of proof in such cases, as the above caselaw makes clear.

16. Claims 9 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadien in view of Sato.

17. Cadien discloses (Column 2, Lines 29-54; Fig 3a-e) a method of manufacturing a semiconductor device comprising the steps of forming a first interlayer insulating film

(302) on a semiconductor substrate (300) forming an plurality of openings (304; Column 3, Lines 52-54) in said interlayer film, forming conductor film (308) on said interlayer and removing a portion of the conductor film and forming a conductive plugs (308) and forming an interconnect conductor (312, "line").

18. Cadien does not appear to show the use of CMP after an etch process for planarization.

19. However Sato utilizes CMP after an etch step (shown in Fig 1; Column 3, Lines 1-15) comprising: removal of a conductor from insulating film through a chemical etch ("RIE") to form a plug ("metal contact") from said conductor filled in an opening and then leveling (Column 4, Lines 6-12) the surface of said insulating film from which the conductor film has been removed until the surface of the insulating film and plugs are flush by CMP.

20. It would have been obvious to one of ordinary skill in the art to incorporate a CMP step after an etch step to the interconnect structure of Cadien, in order to eliminate inferior coverage as taught by Sato (Column 2, Lines 45-46, 59-64).

Conclusion


21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

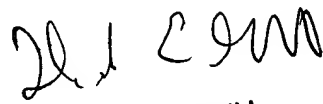
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Talbott can be reached on (703) 305-9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703)

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305-3432 for regular communications and (703) 305-3230 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


jmm
April 14, 2002


DAVID E. GRAYBILL
PRIMARY EXAMINER

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